Assignment by Malakounidis Paris

Github repo: https://github.com/m3fisto/assignment

The project was developed on a macbook Pro using the VScode IDE and was also tested on a Win10 pc.

The programming language is Python as requested in the exercise. Flask is used to create a simple API service and Pytest is used for both the functional and the non functional testing.

All the needed python dependencies can be found in requirements.txt located on the root folder of the project. Docker is also used for containerizing the service

The service

A REST api server is created using Flask. It serves GET requests on 3 endpoints on http://localhost:8800 The available endpoints are:

/people/<num>

/planets/<num>

/starships/<num>

Once the service is up it serves predefined json files

A server log file is created with the startup of the service on the root folder of the project and is named server_app.log. The log keeps track of HTTP requests on the server and the relevant response status code.

```
E server_app.log

1 INFO:werkzeug: ■[31m■[1mWARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead. ■[0m

2 *Running on all addresses (0.0.0.0)

3 *Running on http://21.0.0.1:8800

4 *Running on http://10.240.1.24:8800

5 INFO:werkzeug: ■[33mPress CTRL+C to quit=[0m

6 INFO:werkzeug: *Restarting with stat

7 WARNING:werkzeug: *Debugger is active!

8 INFO:werkzeug: *Debugger PIN: 135-069-120

9 INFO:werkzeug: 277.0.0.1 - [12/Apr/2023 14:26:42] "GET /people/12/ HTTP/1.1" 200 -

10 INFO:werkzeug: 127.0.0.1 - [12/Apr/2023 14:33:29] "■[33mGET /planets/200/ HTTP/1.1=[0m" 404 -
```

Functional Tests

Functional tests were created in order to test happy and edge scenarios on the service. They are located in the /tests folder and named service_test.py A sample manual execution of the tests is the below(given the app is running):

pytest ./test/service_test.py --html=reportFT.html
and outputs:

```
Darismalakounidis@@2CG1QAWDBR python_assignment % pytest ./test/service_test.py —html=reportFT.html

platform darvin — Python 3.9.16, pytest-7.1.2, pluggy-1.0.0
benchmark: 4.0.0 (defaults: timer=time.perf_counter disable_gc=False min_rounds=5 min_time=0.000005 max_time=1.0 calibration_precision=10 warmup=False warmup_iterations=1
000000)
routdir: /Users/parismalakounidis/Desktop/projects/python_assignment, configifile: pytest.ini
plugins: reporter—html=0.8.2, playwright=0.3.0, html=3.2.0, base=url=2.0.0, docker=1.0.1, reporter=0.5.2, metadata=2.0.4, benchmark=4.0.0, flask=1.2.0
collected 7 items

test/service_test.py::test_get_people_PASSED

test/service_test.py::test_get_people_error PASSED

test/service_test.py::test_get_planet_PASSED

test/service_test.py::test_get_planet_error PASSED

test/service_test.py::test_get_starships PASSED

test/service_test.py::test_get_starships_error PASSED

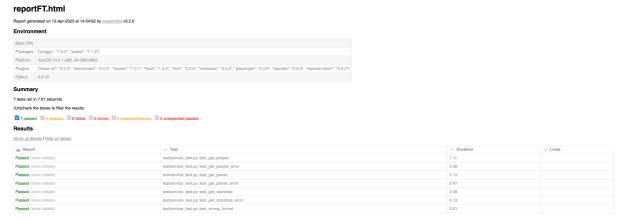
test/service_test.py::test_get_starships_error PASSED

test/service_test.py::test_get_starships_error PASSED

[38%]
test/service_test.py::test_get_planet_PASSED

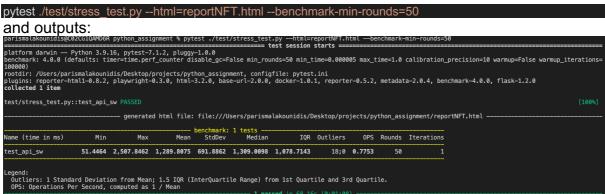
[38%]
test/service_test.py::test_get_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passed_passe
```

An .html report is also created with filename reportFT.html:



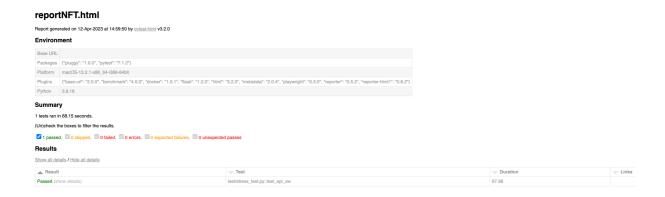
Performance Tests

Performance tests were created in order to measure the average response time of the server. They are located in the /tests folder and named stress_test.py A random delay has been introduced in the server (between 0-2,5 secs per request) Sample manual execution of the tests is the following (given the service is up and running:



On the above printout we can identify the Mean and standard deviation values. The test run for approximately one minute and the mean response time was 1.28 sec which is expected since the incurred delay on the server side is a random [0:2.5] seconds.

An .html report is also created with filename reportNFT.html:



Docker

A local docker image has to be created so the suite can run automatically. This can be done by executing on the root folder (where the dockerfile is located):

docker build -t api-sw .

This will create an image named api-sw. This image contains the API service

The image can be started manually via:

docker run -d --name api-sw -p 8800:8800 api-sw

This will create a container that listens on localhost:8800 and serves the app

Test Suite execution

Given the prerequisite that the docker image has been created, we are able to run the tests with one command. This can be achieved with the pytest-docker plugin which spawns the container in order to run the tests and then terminates it in an approach similar to Ephemeral Environments

The above can be done with (the app must not be running either manually or via docker):

pytest --html=report.html --benchmark-min-rounds=50

This will perform the following actions:

- Start the api-sw container
- Wait until it is reachable
- Run the functional tests
- Run the performance tests
- Stop and delete the container

and outputs:

A combined html report was created with filename report.html:

Report generated on 12-Apr-2023 at 16:13:10 by pytest-html v3.2.0

Environment

| Base URL | Package | ("pluggy": 10.0", "pytest": 71.2") | mac05-13.2.1-36.64-386-44bt | Plugins | ("pluge-ut": 20.0", "benchmark": '40.0", 'docker": 11.0.1", "flask": '12.0", "html": '32.0", "metadata": '20.4", "playwright": '03.0", "reporter": '05.2", "reporter-html1": '08.2") | Python | 3.9.16

Summary

9 tests ran in 84 53 seconds

(Un)check the boxes to filter the results.

☑ 9 passed, ☑ 0 skipped, ☑ 0 failed, ☑ 0 errors, ☑ 0 expected failures, ☑ 0 unexpected passes

Results

| Result | ▼ Test | - Duration |
|-----------------------|---|------------|
| Passed (show details) | Tests/fun_test.py::test_status_container | 10.52 |
| Passed (show details) | Tests/service_test.py::test_get_people | 0.57 |
| Passed (show details) | Tests/service_test.py::test_get_people_error | 0.08 |
| Passed (show details) | Tests/service_test.py::test_get_planet | 2.30 |
| Passed (show details) | Tests/service_test.py::test_get_planet_error | 0.80 |
| Passed (show details) | Tests/service_test.py::test_get_starships | 1.16 |
| Passed (show details) | Tests/service_test.py::test_get_starships_error | 0.70 |
| Passed (show details) | Tests/service_test.py::test_wrong_format | 0.01 |
| Passed (show details) | Tests/stress_test.py::test_api_sw | 68.16 |